

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Patent Application No. 09/633,336

REMARKS

Reconsideration and allowance of the subject application are respectfully requested. By this Amendment, Applicant has added new claim 22. Thus, claims 1-6, 8-17, and 19-22 are now pending in the application. In response to the Office Action (Paper No. 17), Applicant respectfully submits that the pending claims define patentable subject matter.

I. Claim Rejections Under 35 U.S.C. § 112

Claims 1-6, 8-17, and 19-21 are rejected as failing to satisfy the written description requirement under 35 U.S.C. § 112, first paragraph, and the definiteness requirement under 35 U.S.C. § 112, second paragraph. The Examiner rejects claims 1-6, 8-17, and 19-21 under 35 U.S.C. § 112, first paragraph, because the Examiner maintains independent claims 1 and 17 recite two limitations that lack adequate written description support in the specification. The two objectionable limitations are the "inserting at least one of the lug groove ribs" limitation and the "rotating the mold" limitation, both of which were added to claims 1 and 17 via the July 29, 2003 Amendment.

The Examiner rejects claims 1-6, 8-17, and 19-21 under 35 U.S.C. § 112, second paragraph, because the Examiner contends the "inserting at least one of the lug groove ribs" limitation and the "rotating the mold" limitation appearing in claims 1 and 17 are unclear.

By this Amendment, Applicant has amended claims 1 and 17 to improve clarity by deleting the limitation "at least one" (in favor of reciting "one of the lug groove ribs") and changing the limitation "rotating the mold" to "rotating one of the upper mold part and the lower

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mold part".² In addition, Applicant has amended some of the dependent claims to be consistent with the amendments to claim 1.

Accordingly, the Examiner is requested to remove the rejections under 35 U.S.C. § 112, first and second paragraphs.

II. Prior Art Rejections

Claim 17 is rejected under 35 U.S.C. § 103(a) as being unpatentable over to Watanabe et al. (USP 4,682,641; hereafter "Watanabe") in view of DE 2 301 414 (hereafter "DE '414"). Claims 1-5, 10-12, 15, 16, 20, and 21 under 35 U.S.C. § 103(a) as being unpatentable over Watanabe in view of DE '414, and further in view of at least one of JP 53-69304 (hereafter "JP '304"), JP 5-229312 (hereafter "JP '312"), and JP 56-25004 (hereafter "JP '004"). Claims 8 and 19 under 35 U.S.C. § 103(a) as being unpatentable over Watanabe in view of DE '414 and at least one of JP '304, JP '312, and JP '004, and further in view of Sipe (USP 2,245,728).³ Claims 6 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Watanabe in view of DE '414 and at least one of JP '304, JP '312, and JP '004, and further in view of Clayton (USP 4,237,955; hereafter "Clayton") and Tsurunaga et al. (USP 5,002,110; hereafter "Tsurunaga"). Claims 13 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Watanabe in view of DE '414 and at least one of JP '304, JP '312, and JP '004, and further in view of to Sato et al. (USP 5,404,925;

² Support for this amendment can be found, for example, in the first full paragraph of page 10.

³ As confirmed with the Examiner via telephone, paragraph 8 of the Office Action incorrectly indicates the Sipe reference as "US 4194548." US 4,194,548 is the patent number for the Roger reference, which is applied against claims 13 and 14 (not claims 8 and 19).

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hereafter "Sato") or Roger (USP 4,194,548). Applicant respectfully traverses the prior art rejections.

In the July 29, 2003 Amendment, Applicant amended claims 1 and 17 to recite that the method involves inserting a lug groove rib into a corresponding carved groove of the green tire "while rotating the mold relative to the green tire." Applicant argued that this specific feature is in sharp contrast to the collective teachings of the prior art, which discloses moving the mold parts in axial and radial directions relative to the tire, but not rotating the mold parts relative to the tire.

The Examiner now rejects independent claims 1 and 17 by continuing to rely on Watanabe as the primary reference, and looking to the *newly cited* DE '414 reference to allegedly teach a rotating mold part.

By this Amendment, Applicant has amended claims 1 and 17 to further define the specific angle through which the upper mold part is rotated. In particular, amended claims 1 and 17 recite that the method involves rotating one of the upper mold part and the lower mold part relative to the green tire "*through an angle corresponding to an angle between a longitudinal axis of the carved groove and an axis of the tire.*"⁴ Applicant respectfully submits that the combined references do not teach or suggest this feature of the claimed invention.

As shown Fig. 1, DE '414 discloses a mold for molding pneumatic tires which includes an upper (top) mold half 4 and a lower mold half 4. The lower mold half 6 is adapted to be raised and lowered relative to the upper mold half 4 by a hydraulic cylinder device 10. The

⁴ An exemplary embodiment of this feature is discussed in the specification at p. 10, first full paragraph.

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lower mold half 6 is provided with an upwardly projecting guide member 12, while the upper mold half 4 is provided with downwardly directed parallel guide members 13 and 14. When the mold is to be closed, the lower mold half 6 is raised toward the upper mold half 4, so that the guide member 12 is raised into a space 19 defined between the guide members 13 and 14. As a result, the upper and lower mold halves 4 and 6 are correctly positioned with respect to the circumferential direction of the mold before the tire molding operation is carried out. After the molding operation is completed, the mold is opened by lowering the lower mold relative to the upper mold half 4 (note Fig. 1 illustrates a state in which the mold has been opened with molded tire 18 having formed grooves disposed in the lower mold half 6).

When lowering the lower mold half 6, the guide member 12 (in an upright position shown in Fig. 1) is rotated out of the space 19 to move out of engagement with the guide members 13 and 14. For example, as shown in Figs. 2 and 3, a guide member 27 is pivotally mounted (29) on a lower mold half 21. When the guide member 27 is in an upright position (shown by the solid line), the guide member 27 is in engagement with a space 24 between guide members 22 and 23 for an upper mold half 23. In order to remove the guide member 27 from engagement with the space 24 between the guide members 22 and 23, the guide member 27 is rotatably lowered to the position shown by broken line.

After the guide member 12 (Fig. 1) has been removed from engagement with the space 19, the lower mold half 6 is allowed to rotate freely around its vertical axis relative to the upper mold half 4. When the molding operation has been completed, lug groove ribs (not shown) formed on the inner surface of the upper mold half 4 are still in engagement with lug grooves (often in spiral shape) of the tire 18 which are molded by the upper mold half 4. For this reason,

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the molded tire 18 and the lower mold half 6 supporting the tire cannot be moved down in straight line away from the upper mold half 4 due to interference between the lug grooves formed and the lug groove ribs of the upper mold half 4. However, since the lower mold half 6 can be rotated relative to the upper mold half 4, the lower mold half 6 can be separated from the upper mold half 4 by rotated the lower mold half 6 together with the molded tire 18 supported thereon, while moving downward.

It should be noted that this relative rotation of the lower mold half 6 is caused due to guiding function of the lug groove ribs on the inner surface of the upper mold half 4. That is, the lug groove ribs with which interference should be avoided are used as guide means to prevent interference of the molded tire with the lug groove ribs. Thus, the rotation of one of the mold parts (halves) for avoiding interference is performed by the grooves of the molded tire when the mold is to be opened after the molding operation is completed.

On the other hand, in the present invention, a green tire is previously formed with a carved groove such as a spiral groove in the tread surface and is inserted into a mold made up of upper and lower mold parts. When the green tire with the carved groove is to be introduced into the mold, one of the mold parts is rotated relative to the green tire through an angle corresponding to an angle between a longitudinal axis of the carved groove and the axis of the tire. In the present invention, the rotation of the mold part is performed/guided not by the molded tire itself, with which interference should be avoided, but by separately provided slide guides 13 and 14 (see Fig. 1 of the present application). Further, in the present invention, one of the mold parts is rotated prior to molding the tire (i.e., when the tire to be processed is being

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introduced into the mold), contrary to the case of DE '414 in which the rotation of the lower mold half is performed after the molding or processing operation has completed.

Although DE '414 discloses the guide members 13 and 14 of the upper mold half 4 include edge surfaces 15 and 16 are inclined in opposite directions and contact the guide member 12 of the lower mold half 6 as the lower mold half 6 is raised to cause the lower mold half 6 to rotate into a central position for obtaining the desired orientation between the two mold halves 4 and 6, this guiding feature is provided without any regard to carved grooves (not disclosed) of the green tire. Indeed, depending on the initial orientation between the two mold halves (in the open condition) of DE '414, the lower mold half may be rotated in either a clockwise or a counter clockwise direction upon closing the two mold halves. Thus, the cooperating guide members 12, 13, 14 of DE '414 do not cause the lower mold half to rotate through an angle corresponding to an angle between a longitudinal axis of the carved groove and an axis of the tire upon closing the mold halves, as claimed.

By this Amendment, Applicant has amended dependent claim 21 to recite each of the slide guides includes a slide face which is inclined relative to the axis of the tire at an angle corresponding to the angle between the longitudinal axis of the carved groove and the axis of the tire. Further, Applicant has added new dependent claim 22 to further define the claimed invention of claim 17 by reciting the step of rotating said upper mold part relative to said lower mold part is carried out with a slide guide fixed to the upper mold part being guided by a slide guide fixed to the lower mold part, wherein each of the slide guides includes a slide face which is inclined relative to the axis of the tire at an angle corresponding to the angle between the longitudinal axis of the carved groove and the axis of the tire. For the reasons discussed above,

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Applicant respectfully submits that the combined references do not teach or suggest these features.

Accordingly, Applicant respectfully submits that independent claims 1 and 17, as well as dependent claims 2-6, 8-16 and 19-22, should be allowable because the combined references do not teach or suggest all of the features of the claimed invention.

III. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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